Product Manual

saes getters

SAES Pure Gas, Inc.

MONO TORR®

PS15-GC50-CDA/O2/N2-1/2

Foreword

This operation manual provides the information required to operate the PS15-GC50-CDA/O2/N2 purifier. This manual is not intended to provide servicing instructions to the user. The purifier should be operated only by personnel who are familiar with the procedures required for safe operation. It is strongly recommended that the factory be consulted before any maintenance or repairs are attempted.

IMPROPER INSTALLATION, OPERATION, OR SERVICE OF THE MONO-TORR® PURIFIER CAN CAUSE ELECTRICAL FIRE AND/OR ELECTROCUTION.

IF AN ELECTRICAL FIRE OCCURS INSIDE THE ELECTRICAL CABINET, EXTINGUISH IT USING CLASS A, B, OR C EXTINGUISHERS. IF A FIRE OCCURS INSIDE THE PURIFIER, EXTINGUISH THE FIRE WITH SAND OR AN EXTINGUISHER INTENDED FOR CLASS D (METAL) FIRES ONLY. DO NOT ATTEMPT TO EXTINGUISH A PURIFIER FIRE WITH ANY OTHER MATERIALS.

THIS PURIFIER IS DESIGNED TO PURIFY CDA AND OXYGEN ONLY. THIS PURIFIER SHOULD NEVER BE USED TO PURIFY ANY OTHER GASES. IF THIS PURIFIER IS USED TO PURIFY GASES OTHER THAN CDA OR OXYGEN THE PURIFIER WILL BE PERMANENTLY DAMAGED; IT MAY RAPIDLY AND UNCONTROLLABLY OVERHEAT AND COULD CAUSE A FIRE.

THE PURIFIER MUST HAVE ELECTRICAL POWER, INSTRUMENT AIR PRESSURE, AND APPLICABLE GAS PRESSURE FOR PROPER OPERATION. IF PROPER ELECTRICAL POWER, INSTRUMENT AIR PRESSURE, AND APPLICABLE GAS PRESSURE ARE NOT SUPPLIED, THE PURIFIER COULD BE PERMANENTLY DAMAGED AND THE FACTORY WARRANTY WILL BE VOID.

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Product Warranty

Limited Warranty and Disclaimer of Warranties.

SAES warrants that its products and parts will perform in accordance with SAES's published specifications or the specifications agreed to by Buyer and SAES in writing and referring to this order. This warranty shall have a term of TWELVE (12) MONTHS from the date of installation at Buyer's facility or EIGHTEEN (18) MONTHS from the date of shipment, whichever term is shorter. Subject to the remainder of this Paragraph 7, any action by Buyer for any alleged breach of this warranty shall be brought by Buyer within thirty (30) days of Buyer's discovery of the breach. This warranty shall only apply to the Buyer and may not be assigned.

During the term of the warranty set forth above, SAES will promptly repair goods which do not conform to the specifications and which Buyer returns to SAES at the address provided below. Buyer shall be responsible for all transportation charges incurred in returning goods to SAES for repair, provided that SAES shall be responsible for such charges if Buyer obtains a Returned Material Authorization ("RMA") number and specific shipping instructions from the SAES PURE GAS Field Support Group prior to its shipping of the goods to SAES. SAES shall not unreasonably deny Buyer authorization to ship goods to SAES and an RMA number upon Buyer's request under this Paragraph. SAES shall return repaired goods to buyer, with surface transportation charges prepaid by SAES.

If SAES, in its sole discretion, determines that it is not commercially practicable to repair goods returned by Buyer, SAES will either (i) replace those goods or (ii) refund the purchase price to Buyer, less the reasonable pro-rated rental value of the goods for the period during which Buyer used them prior to its discovery of their failure to comply with the warranty set forth above. Buyer expressly agrees that should SAES replace returned goods, the replacement goods may consist of or contain refurbished goods and/or parts. Any refurbished goods or parts SAES ships to Buyer under this Paragraph shall be equivalent to new in performance, shall meet SAES's published specifications or the specifications agreed to by Buyer and SAES in writing and referring to this order, and shall be subject to the limited warranties set forth in this Paragraph. SAES shall be responsible for any surface transportation charges incurred in shipping replacement goods to Buyer.

The warranty set forth above shall not apply to damage resulting from (i) loss or damage in transit; (ii) unreasonable use (including without limitation the failure to provide reasonable and necessary maintenance); (iii) accident; (iv) Buyer's attempt to make or cause to be made any repairs or alterations on the goods and parts covered during the warranty period without the prior written permission of SAES; (v) Buyer's acts or omissions which subject the goods to more rigorous environments than are set forth in the applicable specifications, including without limitation Buyer's use of toxic, corrosive or caustic liquids and/or gases with the goods; (vi) Buyer's negligence, mishandling, misuse, abuse or use which is not in accordance with SAES's specifications and instructions; or (vii) any defects in those purchased goods which Buyer has detected after the end of the term of the warranty herein. SAES reserves the right to examine the goods returned to determine if the warranty is applicable. SAES MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND SAES DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SAES MAKES NO WARRANTY THAT THE GOODS DO NOT INFRINGE ANY PATENT,TRADEMARK, COPYRIGHT OR SIMILAR RIGHTSOF THIRD PARTIES AND SAES DISCLAIMS ANY IMPLIED WARRANTY OF NONINFRINGEMENT.

The warranty set forth above is the only warranty made by SAES with respect to the goods delivered hereunder, and no employee, representative or other person or entity is authorized to assume for SAES any obligations or liability beyond or at variance with that warranty in connection with the sale of SAES's goods.

Limitation of Liabilities. BUYER AND SAES AGREE THAT (I) THE SOLE AND EXCLUSIVE REMEDIES FOR BREACH OF ANY WARRANTY CONCERNING THE GOODS SHALL BE REPAIR OR REPLACEMENT OF THOSE GOODS OR THEIR COMPONENT PARTS OR REFUND OF THE PURCHASE PRICE AS STATED IN PARAGRAPH 7 ABOVE; AND (II) SAES SHALL HAVE THE EXCLUSIVE RIGHT TO SELECT ANY SUCH REMEDY IN ITS SOLE DISCRETION.

IF SAES BREACHES THIS AGREEMENT, BUYER'S SOLE DAMAGES SHALL BE THE DIFFERENCE BETWEEN THE MARKET PRICE AND THE CONTRACT PRICE. SAES SHALL NOT BE LIABLE FOR CONTINGENT, INCIDENTAL OR CONSEQUENTIAL DAMAGES TO PERSONS OR PROPERTY AND SAES'S SOLE LIABILITIES AND BUYER'S EXCLUSIVE REMEDIES HEREUNDER ARE AS PROVIDED IN THESE STANDARD TERMS AND CONDITIONS OF SALES. SAES SHALL NOT BE LIABLE FOR ANY EXCESS REPROCUREMENT COSTS OR SPECIFIC PERFORMANCE.

Notwithstanding any implication to the contrary, SAES shall have no liability whatsoever unless and until Buyer shall have paid the full purchase price of all goods delivered.

Proprietary Rights. Buyer agrees that any of SAES's Software and Firmware products ordered or included in the Goods ordered are proprietary to Seller. No change, modification, defacement, alteration, reverse engineering decompilations or reproduction of such Software or Firmware products or disclosure of programming content to other parties is allowed without the express prior written consent of SAES. TO THE EXTENT NECESSARY TO MAINTAIN SELLER'S TRADE SECRET, COPYRIGHT, AND OTHER PROPRIETARY PROTECTION OF

Specifications

Maximum Flow Rate:	3 slpm
Maximum allowable working pressure:	10.3 bar (150 psig)
Process Gas:	N_2, $O_{2,}$, or Clean Dry Air (CDA)
Maximum Inlet Impurities:	THCs, CO, & H_2 @ < 2 ppm (CDA/N_2)
	THCs, CO, & H_2 @ < 30 ppm (O_2)
Impurities removed:	THCs (CH_4, and NMHCs) CO, & H_2 to<1 ppb
Operating temperature:	350°C
Outlet gas temperature:	<50°C
Voltage:	220V
Pdo confinement:	20 μm in/out porous SS filter
Inlet/outlet connection:	1/8 swaglock
Tubing Surface Finish:	304 SST
Overall dimensions:	20 x 20 x 85 cm (8” x 8” x 33”) (See drawings)
Standard power cord length:	244 cm (96”)
Weight:	23 kg (51 lbs)
	4 A fuse (220V)

General Information

This product manual provides information about the MonoTorr® PS15 -GC50-N_2 / O_2 /CDA purifier manufactured by SAES Pure Gas Inc. This manual provides a brief description, installation, and assembly information for the purifier.

OPERATOR SHOULD NOT ATTEMPT TO REPAIR THE PURIFIER. ANY REPAIRS ATTEMPTED WILL VOID THE MANUFACTURER'S WARRANTY.

The purifying alloy is selected to purify nitrogen or rare gases CDA. The model and application is on the identification tag on the outer case of the purifier. The example below is a CDA, PS 15 series, 1500 model 110 VAC Purifier.

The MonoTorr N_2, O_2, or CDA (clean, dry air) purifier is designed to decrease the concentration of hydrocarbons to less than 1 ppb. The process employed is catalytic oxidation of any reducing species – CH_4 (and other "total hydrocarbons" or THCs), CO and H_2. This process requires that the catalyst material operates at an elevated temperature. When the heated material is exposed to reductive impurities of THCs, CO and H_2 in the presence of oxygen, all these impurities combine with the oxygen to form CO_2 and H_2O.

Hydrocarbon removal and Oxygenation:
The PS15 purifier internal process media uses oxygen to convert hydrocarbons (as well as CO and H2) into CO2 and H2O. The media uses both oxygen in the gas stream, as well as oxygen that is stored in the media. Normally, the combination of the inlet oxygen and the stored oxygen are sufficient to continue hydrocarbon oxidation. However, if there is insufficient oxygen present in the inlet gas, the stored oxygen will be consumed, and the hydrocarbon oxidation will stop. In this case, the user must "oxygenate" the media. This is a very simple process - allow the PS15 purifier to cool to room temperature, then expose the PS15 to oxygen or CDA. This is best done by using an oxygen or CDA (4N purity or better) cylinder to fill the vessel to a pressure between 25 and 100 psig. This is normally done from an inlet connection. Allow the pressure to stabilize for 5 minutes, then vent and cap off the connection. The PS15 is now ready for use again. It is recommended to purge the system for one hour at low flow and with the purifier at operating temperature before resuming the purification process.

After the N_2, O_2, or CDA is exposed to the heated catalyst, the inlet impurities of CO, CO_2, H_2, H_2O, and CH_4 are converted to CO_2 and H_2O. All carbons that enter as CO, CO_2 and CH_4 leave as CO_2, so although the THC concentration is decreased, there is a corresponding increase in CO_2. This pattern also applies to the hydrogen containing species, resulting in increased H_2O concentration at the outlet.

The catalyst vessel is designed for continuous operation and is not consumable. The catalyst operates at approximately 350° C. Heating is provided by a cable heater, and the temperature is monitored by two thermocouples mounted to the vessel.

THE FINNED OUTER SURFACE OF THE PURIFIER'S VESSEL CASING IS A FUNCTIONAL HEAT SINK AND IS AT AN ELEVATED TEMPERATURE DURING NORMAL OPERATION.

Description

The GC50 is designed for the purification of carrier gases used in analytical applications.

Outlet impurity levels for H_2, CO, CH_4 are reduced to low parts per billion (ppb) levels.

The purifier comes completely assembled with a 1/8” compression fitting for both the gas inlet and the outlet. Both fittings are located on the top of the purifier.

At the rated flow of 3 slpm and at rated working temperature, the purifier column has an infinite lifespan.

Installation

Handling

The level of performance depends upon the care and attention to the proper handling of the purifier. Exposure to non-UHP environments and physical contact of sealing surfaces will reduce the quality and life of the purifier.

STRICT ADHERENCE TO UHP COMPONENTS HANDLING PROCEDURE IS REQUIRED TO MAINTAIN THE FACTORY SPECIFICATIONS. DO NOT ALLOW THE PURIFIER CARTRIDGE TO BE EXPOSED TO ATMOSPHERE. THE PURIFIER SHOULD BE PURGED WITH AN INERT GAS OR THE APPLICATION GAS ONLY.

INERT GASES CAN DISPLACE OXYGEN AND FUNCTION AS ASPHYXIANTS. EXPOSURE TO ATMOSPHERES CONTAINING LOW CONCENTRATIONS OF OXYGEN MAY CAUSE SUFFOCATION. REFER TO THE CHEMICAL SUPPLIER’S MSDS FOR PROCESS GAS BEFORE USE AND ADHERE TO ALL APPLICABLE BUILDING CODES.

The purifier should be packaged and stored in a clean, dry environment until used. Do not open until the intended time of installation.

Unpacking and Inspection

Each purifier is backfilled with argon and sealed in a polyethylene bag. The ends of the purifier are plugged with caps. Check the label on the outlet connection and verify the application.

- Remove packaging containers and materials such as boxes, crates, and cushioning outside the clean area.
- Do not tear the polyethylene bag. Use a sharp instrument to cut the seal, taking care not to damage the item inside the bag.

Mounting

A mounting bracket is supplied to simplify mounting. Any convenient location allowing the purifier to be mounted vertically is sufficient. **Only mount the purifier in a vertical position.**

The purifier comes sealed in an argon atmosphere and must be purged before purification can begin.

Installation/Purge Instructions

1. Purge the lines, with an inert gas, upstream of the purifier thoroughly.

2. While under purge, using standard UHP procedures, remove the inlet cap and connect the inlet fitting to the line as quickly as possible, no longer than 30 seconds.

3. Remove the outlet fitting cap and, using standard UHP procedures, connect the down stream gas line as quickly as possible, no longer than 30 seconds.

4. The purifier should be purged with the application gas for at least ten minutes prior to the start of heating.

5. The purifier can now be activated.

⚠**NOTE:** Leak testing the purifier is recommended before activating.

Leak Testing

The purifier has been certified helium leak tight to less than 10^{-9} scc/sec of He (inboard). Once installed, the purifier connections should be tested for leak integrity.

Operation

Activating

Activation starts when the heater is plugged in. The purifier should be operated for at least two hours prior to injecting any sample into the GC50.

The effluent carrier gas should be vented and not directed to the process during this period. The use of high purity purge gas through all purging and activation procedures is strongly recommended.

Service

The purifier is maintenance free. It is designed to operate continuously without service throughout its rated capacity as long as the gas flowing is the carrier gas.

Purifier Removal

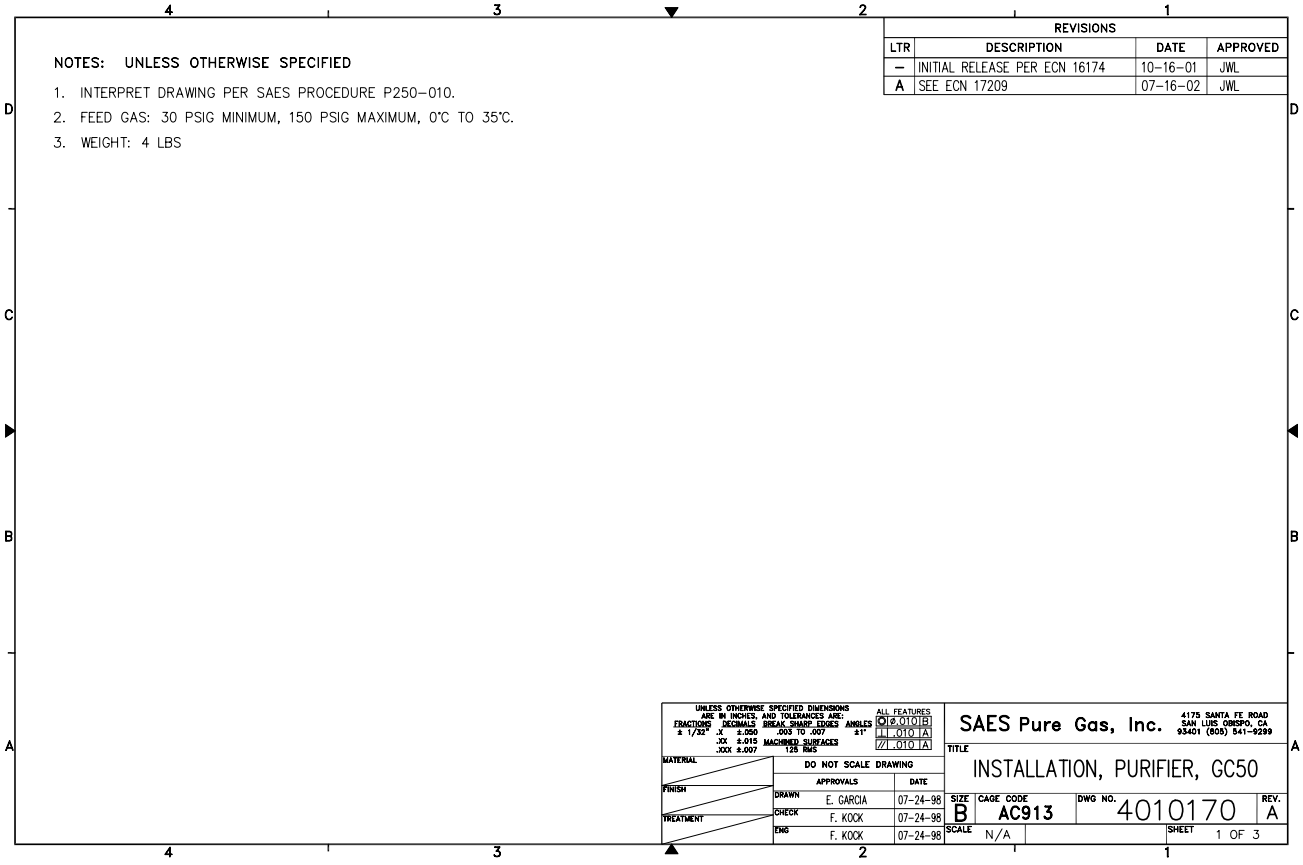
1. Prior to removal, the power must be shut off and the purifier allowed to cool to room temperature (this takes approximately 3 hours).

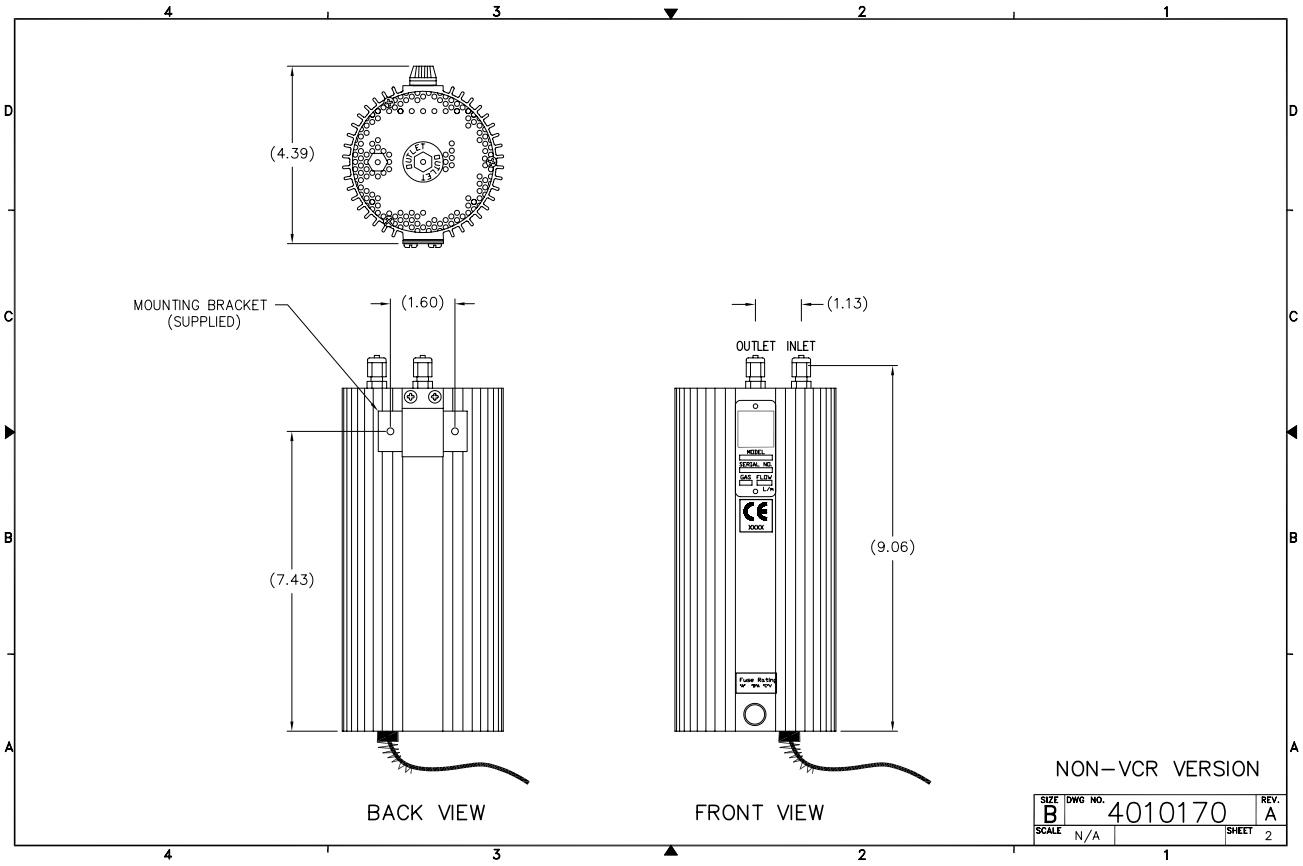
2. While cooling, purge the purifier with inert gas.

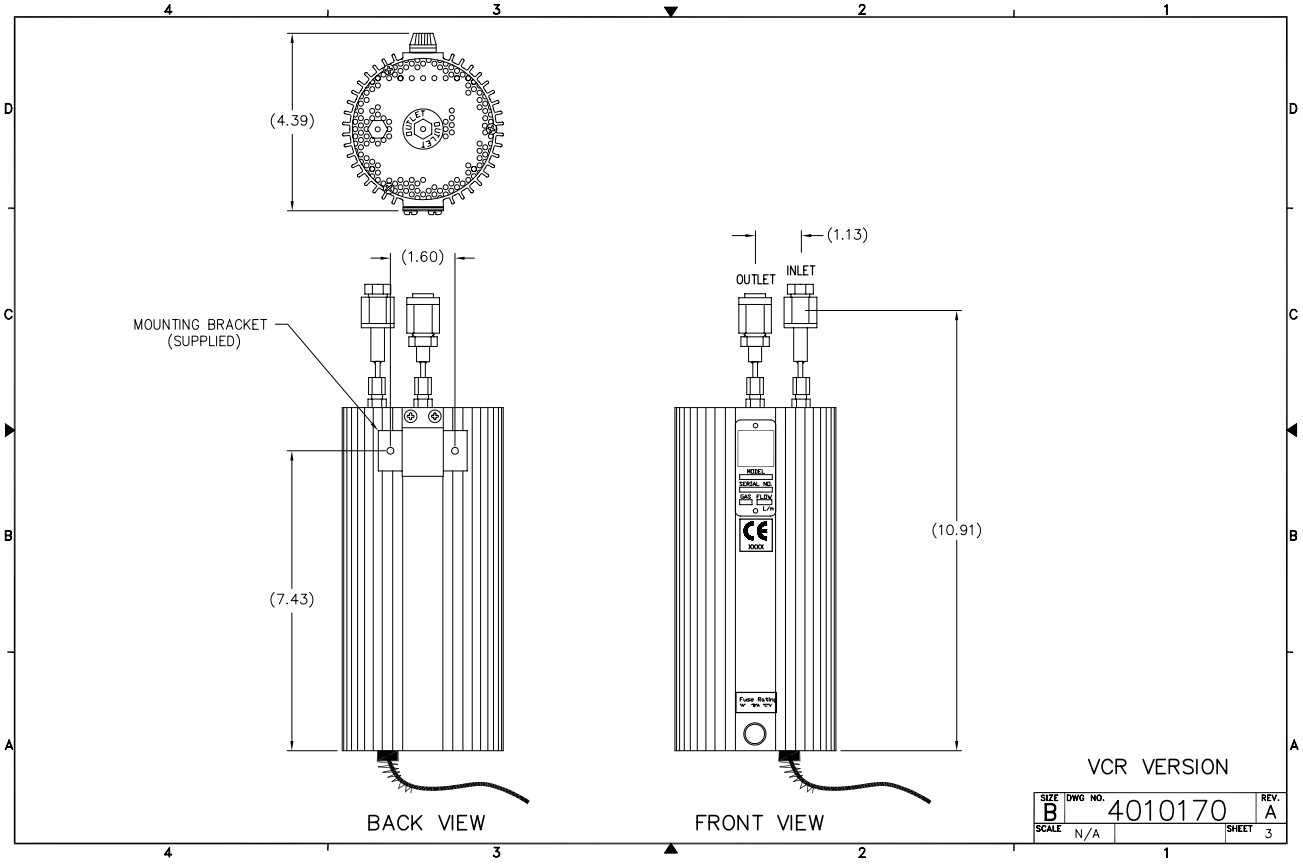
3. While under purge, quickly disconnect the outlet line and replace the outlet cap. Next, quickly disconnect the inlet line and replace the inlet cap.

4. Remove the purifier from the mounting bracket.

Installation Drawing


REVISIONS
LTR | DESCRIPTION | DATE | APPROVED
– | INITIAL RELEASE PER ECN 16174 | 10–16–01 | JWL
A | SEE ECN 17209 | 07–16–02 | JWL
NOTES: UNLESS OTHERWISE SPECIFIED
1. INTERPRET DRAWING PER SAES PROCEDURE P250–010.
2. FEED GAS: 30 PSIG MINIMUM, 150 PSIG MAXIMUM, 0°C TO 35°C.
3. WEIGHT: 4 LBS
SAES Pure Gas, Inc.
4175 SANTA FE ROAD SAN LUIS OBISPO, CA 93401 (805) 541–9299
TITLE
INSTALLATION, PURIFIER, GC50
DO NOT SCALE DRAWING
APPROVALS | DATE
DRAWN E. GARCIA 07–24–98
CHECK F. KOCK 07–24–98
ENG F. KOCK 07–24–98
SIZE B
CAGE CODE AC913
DWG NO. 4010170
REV. A
SCALE N/A
SHEET 1 OF 3


(4.39)
MOUNTING BRACKET
(SUPPLIED)
(1.60)
(7.43)
(1.13)
OUTLET INLET
(9.06)
BACK VIEW
FRONT VIEW
NON–VCR VERSION
SIZE B
DWG NO. 4010170
REV. A
SCALE N/A
SHEET 2


(4.39)
MOUNTING BRACKET
(SUPPLIED)
(1.60)
(7.43)
(1.13)
OUTLET INLET
(10.91)
BACK VIEW
FRONT VIEW
VCR VERSION
SIZE B
DWG NO. 4010170
REV. A
SCALE N/A
SHEET 3

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